

# Certificate of Analysis

## Standard Reference Material 1095

### AISI 4340 Steel

(Gasometric Standard)

This standard is in the form of rods 6.4 mm (1/4 in) in diameter and 102 mm (4 in) long for the determination of gases in metals by vacuum or inert gas fusion and neutron activation methods of analyses.<sup>a</sup>

Element	PPM by Weight
Oxygen	9 <sup>b</sup>
Nitrogen	(37) <sup>c</sup>
Hydrogen	(<5)

<sup>a</sup>This material also is available in the form of disks, SRM 1261, 31 mm (1 1/4 in) in diameter and 19 mm (3/4 in) thick for use in optical emission and x-ray spectrometric analysis; chips, SRM 361, for use in chemical methods of analysis; and rods, SRM 661, 3.2 mm (1/8 in) in diameter and 51 mm (2 in) long for application in microchemical methods of analysis such as electron probe microanalysis, spark source mass spectrometric analysis, and laser probe analysis.

<sup>b</sup>The certified value of 9 ppm oxygen is based on the following pertinent analytical data:

NBS			Applied Research Laboratory; U. S. Steel Corp.					
Vacuum Fusion			Vacuum Fusion			Neutron Activation		
$\bar{X}$	$s$	$n$	$\bar{X}$	$s$	$n$	$\bar{X}$	$s$	$n$
8.3	1.2	44	10.0	1.4	12	8.8	1.3	4*

$\bar{X}$  = mean oxygen value;  $s$  = standard deviation of a single determination;  $n$  = number of independent determinations

\*The average of 10 replicate measurements was reported for each of 4 samples.

<sup>c</sup>Values in parenthesis are not certified since they are based on the results from a single laboratory.

The overall direction and coordination of the technical measurements at NBS leading to certification were performed under the direction of O. Menis and J. T. Sterling.

The technical and support aspects involved in the preparation, certification, and issuance of this standard reference material were coordinated through the Office of Standard Reference Materials by R. E. Michaelis.

Washington, D. C. 20234  
October 23, 1970

J. Paul Cali, Acting Chief  
Office of Standard Reference Materials

(over)

**PLANNING, PREPARATION, TESTING, ANALYSIS:** This standard is one of five replacements for the original eight 1100 series iron and steel SRMs. Material from the same melt is available in a variety of forms to serve in checking methods of analysis and in calibrating instrumental techniques.

The material for this standard was vacuum melted and cast at the Carpenter Technology Corporation, Reading, Pennsylvania, under a contract with the National Bureau of Standards. The contract was made possible by a grant from the American Iron and Steel Institute.

The ingots were processed by Carpenter Technology Corporation to provide material of the highest possible homogeneity. Following acceptance of the composition based on NBS analyses, selected portions of the ingot material were extensively tested for homogeneity at NBS by D. M. Bouchette, S. D. Rasberry, and J. L. Weber, Jr. Only that material meeting a critical evaluation was processed to the final shapes and sizes.

Cooperative analyses for oxygen were performed in the Applied Research Laboratory, United States Steel Corporation, Monroeville, Pennsylvania, by J. F. Martin and E. E. Wicker.

Analyses for oxygen were performed in the Analytical Chemistry Division of the National Bureau of Standards by J. T. Sterling.

**CAUTION:** Oxygen determinations should be made on thoroughly and freshly cleaned samples.

#### **PREPARATION FOR THE DETERMINATION OF OXYGEN:**

1. Samples should be cut from the original rod to minimize heating of the sample; i.e., by a hand hacksaw.
2. All surfaces of the cut sample should be thoroughly cleaned with a fine file.
3. Samples should be washed with C. P. ether, acetone, or other suitable solvent, dried in a stream of warm clean air and then handled only with clean forceps.
4. Analyses should be made as soon as possible after cleaning the sample.